COMMENTARY

THE EFFECT OF DIFFERENT POLISHING SYSTEMS ON SURFACE ROUGHNESS AND GLOSS OF VARIOUS RESIN COMPOSITES

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Composite systems continually appear on the market, and clinicians use them in practice for various reasons; often, they get used to a product and use it for years. At the same time, polishing systems seem to appear with greater frequency, with each system claiming ability to polish better than others. Yet most clinicians continue to use the same polishing system they and their staff have become comfortable with. There are many variables that determine the polishability of a composite material, just as there are many variables that determine the ability of a polishing system to perform to the high standard demanded by dentists. This article, from a respected institution, attempts to address this problem with an in vitro research study comparing five direct composite resins and six polishing systems. For control, the same composite was used, placed, light-cured, and stored before testing in the same manner. The entire article is thorough in its description of techniques and discussion of topics such as the various types of composites and the existing differences between them. The discussion section is very insightful into the reasons for the results of the study, with the conclusion that further study is needed.

The two properties recorded for each composite with all polishing systems were surface roughness and gloss. Surface roughness is defined as the finer irregularities of a final restoration that are inherent as a result of the makeup and manufacture of the material. Gloss is defined as the clarity of reflection of images of light off the surface of the final restoration. Clinically, it would seem that roughness plus the optimum polishing technique would result in the best restoration, at least initially. The results of this study indicate that, in spite of previous thought, all composites do not predictably polish based on particle size alone. In this study, nanofill and microfill composites had equal surface roughness, yet the minifill polished to the same degree, although all three materials have different types and sizes of fillers. In other words, nanofillers are delivering the esthetic and polishability results they were intended to. Most practitioners prefer simplicity, which means one-step polishing systems would be most attractive, yet many continue to use multistep systems simply because of familiarity and habit. This study shows that single-step systems can perform as well as two- and three-step systems. Some single-step systems may ultimately be less expensive, as some brushes, cups, and disks can be autoclaved and used multiple times.

This study found that a single-step system, Pogo (Dentsply Caulk, Milford, DE, USA), seemed to give the best results overall for most composites, although the significance compared with several other systems was nonexistent or minimal. In general, diamond performs better than aluminum oxide or silicon carbide. The bottom line, however, is whether or not, in clinical in vivo application, there is any difference between any of these polishing systems or composites that is discernible. Clinicians do not want to use a different polishing system for each composite. They want ease of use and universal applicability. For example, similar research with light-curing of composites is confusing when results indicate that different shades can be cured at varying depths depending on tested wavelength of curing lights. Clinicians would not pay attention to this and would pay more attention to advertising, which could be misleading. So it is for composites and polishing systems. There are many combinations of these in practice, most producing acceptable results.

There are some suggestions for future investigations in this area. First, why did this study use 15 fluted carbides for final shaping, when 30 or 40 fluted carbide burs leave a much smoother surface before the final polishing steps? Second, some of these systems remove facial texture from composites, which is critical for esthetic anterior restorations. Future studies should use brushes impregnated with both silicon carbide and diamond after initial finish with burs. The

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time needed to attain the highest possible gloss should be determined with each system. Third, the best way to ensure an esthetic restoration and to increase surface integrity is to etch the surface and seal with a composite sealer. Fourth, most composites will polish, at least initially, comparable to a microfill. However, the surface roughness and gloss are quickly altered in the oral environment. Future studies, both in vitro and in vivo, should address wear and surface degradation over time to determine which final surface treatment, using various polishing systems and composites, results in the greatest longevity and clinical success. Lastly, future studies should use a wider range of the new class of nano-optimized composites, as in this study, this category performed extremely and surprisingly well. This article provided a good start in this area with myriad choices and much confusion. More research is needed to provide clinicians with evidence-based results so decisions will be made using information other than advertising and manufacture loyalty alone.

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